H0465-TMA/RECRA

0051769

Thermo Nutech
W.O. No. N9-07-086-7162

Bechtel Hanford Inc.
SDG H0465

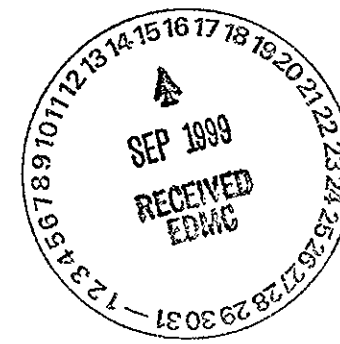
Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0465 is composed of one liquid (water) sample designated under SAF No. B99-080 with a Project Designation of: 200-B/C Controlled Area Reposting Sampling and Analysis.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the TNU Sample Receipt Checklist. The results were transmitted to BHI via facsimile on July 28, 1999.

2.0 ANALYSIS NOTES



2.1 Gamma Scan Analyses

No problems were encountered during the course of the analyses.

2.2 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.3 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.4 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses though recounts were taken on sample BOVYB9 as well as the blank.

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

SAMPLE SUMMARY

SDG 7162
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B0VYB9	200 East	WATER		N907086-01	B99-080	B99-080-01	07/13/99 05:55
Method Blank		WATER		N907086-03	B99-080		
Lab Control Sample		WATER		N907086-02	B99-080		
Duplicate (N907086-01)	200 East	WATER		N907086-04	B99-080		07/13/99 05:55

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 07/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

QC SUMMARY

SDG 7162
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	DAYS SINCE COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7162	B99-080-01	B0VYB9	WATER				07/16/99	3	N907086-01	7162-001
		Method Blank	WATER						N907086-03	7162-003
		Lab Control Sample	WATER						N907086-02	7162-002
		Duplicate (N907086-01)	WATER				07/16/99	3	N907086-04	7162-004

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 07/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

PREP BATCH SUMMARY

SDG 7162
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

TEST	MATRIX	METHOD	PREPARATION BATCH	ERROR 2σ %	PLANCHETS ANALYZED CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALIFIERS
Alpha Spectroscopy												
AM	WATER	Americium 241 in Water	6893-025	5.0	1			1	1	1/1		
PU	WATER	Plutonium, Isotopic in Water	6893-025	5.0	1			1	1	1/1		
Beta Counting												
SR	WATER	Total Strontium in Water	6893-025	10.0	1			1	1	1/1		
Gamma Scan												
GAM	WATER	Gamma Emitters	6893-025	15.0	1			1	1	1/1		

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-PBS
Version 3.06
Report date 07/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

WORK SUMMARY

SDG 7162
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
B0VYB9			N907086-01	7162-001	AM		07/27/99	07/28/99	NJV	Americium 241 in Water
200 East		WATER	07/13/99	7162-001	GAM		07/23/99	07/28/99	NJV	Gamma Emitters
B99-080-01	B99-080		07/16/99	7162-001	PU		07/26/99	07/28/99	NJV	Plutonium, Isotopic in Water
				7162-001	SR		07/23/99	07/28/99	NJV	Total Strontium in Water
Method Blank			N907086-03	7162-003	AM		07/27/99	07/28/99	NJV	Americium 241 in Water
		WATER		7162-003	GAM		07/23/99	07/28/99	NJV	Gamma Emitters
	B99-080			7162-003	PU		07/26/99	07/28/99	NJV	Plutonium, Isotopic in Water
				7162-003	SR		07/23/99	07/28/99	NJV	Total Strontium in Water
Lab Control Sample			N907086-02	7162-002	AM		07/27/99	07/28/99	NJV	Americium 241 in Water
		WATER		7162-002	GAM		07/23/99	07/28/99	NJV	Gamma Emitters
	B99-080			7162-002	PU		07/23/99	07/28/99	NJV	Plutonium, Isotopic in Water
				7162-002	SR		07/23/99	07/28/99	NJV	Total Strontium in Water
Duplicate (N907086-01)			N907086-04	7162-004	AM		07/27/99	07/28/99	NJV	Americium 241 in Water
200 East		WATER	07/13/99	7162-004	GAM		07/23/99	07/28/99	NJV	Gamma Emitters
	B99-080		07/16/99	7162-004	PU		07/27/99	07/28/99	NJV	Plutonium, Isotopic in Water
				7162-004	SR		07/24/99	07/28/99	NJV	Total Strontium in Water

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
AM	B99-080	Americium 241 in Water	AM/CMPLATE	1			1	1	1	4
GAM	B99-080	Gamma Emitters	GAMMAHI	1			1	1	1	4
PU	B99-080	Plutonium, Isotopic in Water	PUPLATE	1			1	1	1	4
SR	B99-080	Total Strontium in Water	SR8990	1			1	1	1	4
TOTALS				4			4	4	4	16

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 07/28/99

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0465

N907086-03 Method Blank

METHOD BLANK

SDG	7162	Client/Case no	Hanford SDG-H0465
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N907086-03	Client sample id	Method Blank
Dept sample id	7162-003	Material/Matrix	WATER
		SAF No	B99-080

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Plutonium 238	13981-16-3	0.006	0.018	0.033	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.009	0.018	0.040	1.0	U	PU
Americium 241	14596-10-2	-0.004	0.025	0.046		U	AM
Total Strontium	SR-RAD	0.022	0.23	0.32	2.0	U	SR
Potassium 40	13966-00-2	U		210		U	GAM
Cobalt 60	10198-40-0	U		12	25	U	GAM
Cesium 137	10045-97-3	U		11	15	U	GAM
Europium 152	14683-23-9	U		30	50	U	GAM
Europium 154	15585-10-1	U		30	50	U	GAM
Europium 155	14391-16-3	U		32	50	U	GAM
Radium 226	13982-63-3	U		21		U	GAM
Radium 228	15262-20-1	U		93		U	GAM
Thorium 228	14274-82-9	U		17		U	GAM
Thorium 232	TH-232	U		93		U	GAM
Americium 241	14596-10-2	U		37		U	GAM
Uranium 238	U-238	U		1300		U	GAM
Uranium 235	15117-96-1	U		42		U	GAM

200-B/C Cont. Area Reposting Smp&Any

QC-BLANK 31322

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 07/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

N907086-02 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7162 Client/Case no Hanford SDG-H0465

Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N907086-02 Client sample id Lab Control Sample

Dept sample id 7162-002 Material/Matrix WATER

SAF No B99-080

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Plutonium 238	12.1	0.94	0.032	1.0		PU	12.6	0.50	96	85-115	80-120
Plutonium 239/240	12.3	0.95	0.046	1.0		PU	13.2	0.53	93	86-114	80-120
Americium 241	11.2	1.0	0.077			AM	11.5	0.46	97	84-116	
Total Strontium	25.7	0.75	0.31	2.0		SR	25.0	1.0	103	83-117	
Cobalt 60	388	32	17	25		GAM	368	15	105	72-128	80-120
Cesium 137	461	28	19	15		GAM	414	17	111	72-128	80-120

200-B/C Cont. Area Reposting Smp&Any

QC-LCS 31321

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 07/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

N907086-04 B0VYB9

DUPLICATE

SDG 7162 Client/Case no Hanford SDG-H0465

Contact L.A. Johnson Case no TRB-SBB-207925

DUPLICATE	ORIGINAL	
Lab sample id N907086-04	Lab sample id N907086-01	Client sample id B0VYB9
Dept sample id 7162-004	Dept sample id 7162-001	Location/Matrix 200 East WATER
	Received 07/16/99	Collected 07/13/99 05:55
		Custody/SAF No B99-080-01 B99-080

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Plutonium 238	0.031	0.028	0.038	1.0	U	PU	-0.008	0.017	0.052	U	-	
Plutonium 239/240	0.003	0.014	0.033	1.0	U	PU	-0.013	0.025	0.057	U	-	
Americium 241	0.004	0.023	0.048		U	AM	0	0.023	0.042	U	-	
Total Strontium	0.058	0.24	0.42	2.0	U	SR	0.155	0.29	0.37	U	-	
Potassium 40	U		130		U	GAM	U		110	U	-	
Cobalt 60	U		5.5	25	U	GAM	U		7.2	U	-	
Cesium 137	U		5.2	15	U	GAM	U		6.3	U	-	
Europium 152	U		15	50	U	GAM	U		20	U	-	
Europium 154	U		16	50	U	GAM	U		24	U	-	
Europium 155	U		13	50	U	GAM	U		16	U	-	
Radium 226	U		11		U	GAM	U		13	U	-	
Radium 228	U		25		U	GAM	U		27	U	-	
Thorium 228	U		8.7		U	GAM	U		11	U	-	
Thorium 232	U		25		U	GAM	U		27	U	-	
Americium 241	U		13		U	GAM	U		16	U	-	
Uranium 238	U		660		U	GAM	U		850	U	-	
Uranium 235	U		20		U	GAM	U		27	U	-	

200-B/C Cont. Area Reposting Smp&Any

QC-DUP#1 31323

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 07/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

N907086-01 B0VYB9

DATA SHEET

SDG	7162	Client/Case no	Hanford SDG-H0465
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N907086-01	Client sample id	B0VYB9
Dept sample id	7162-001	Location/Matrix	200 East WATER
Received	07/16/99	Collected	07/13/99 05:55
		Custody/SAF No	B99-080-01 B99-080

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Plutonium 238	13981-16-3	-0.008	0.017	0.052	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.013	0.025	0.057	1.0	U	PU
Americium 241	14596-10-2	0	0.023	0.042		U	AM
Total Strontium	SR-RAD	0.155	0.29	0.37	2.0	U	SR
Potassium 40	13966-00-2	U		110		U	GAM
Cobalt 60	10198-40-0	U		7.2	25	U	GAM
Cesium 137	10045-97-3	U		6.3	15	U	GAM
Europium 152	14683-23-9	U		20	50	U	GAM
Europium 154	15585-10-1	U		24	50	U	GAM
Europium 155	14391-16-3	U		16	50	U	GAM
Radium 226	13982-63-3	U		13		U	GAM
Radium 228	15262-20-1	U		27		U	GAM
Thorium 228	14274-82-9	U		11		U	GAM
Thorium 232	TH-232	U		27		U	GAM
Americium 241	14596-10-2	U		16		U	GAM
Uranium 238	U-238	U		850		U	GAM
Uranium 235	15117-96-1	U		27		U	GAM

200-B/C Cont. Area Reposting Smp&Any

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

METHOD SUMMARY

AMERICIUM 241 IN WATER

ALPHA SPECTROSCOPY

Test AM Matrix WATER
SDG 7162
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Americium 241
Preparation batch 6893-025					
B0VYB9	N907086-01			7162-001	U
BLK (QC ID=31322)	N907086-03			7162-003	U
LCS (QC ID=31321)	N907086-02			7162-002	ok
Duplicate (N907086-01)	N907086-04			7162-004	- U

Nominal values and limits from method RDLs (pCi/L)
200-B/C Cont. Area Reposting Smp&Any

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6893-025 2σ prep error 5.0 % Reference Lab Notebook 6893 pg.025																
B0VYB9	N907086-01			0.042	0.500			87		723			14	07/27/99	07/27	SS-013
BLK (QC ID=31322)	N907086-03			0.046	0.500			84		723				07/27/99	07/27	SS-015
LCS (QC ID=31321)	N907086-02			0.077	0.500			53		723				07/27/99	07/27	SS-014
Duplicate (N907086-01) (QC ID=31323)	N907086-04			0.048	0.500			86		723			14	07/27/99	07/27	SS-016
Nominal values and limits from method					0.500			20-105		700	100		180			

PROCEDURES	REFERENCE	AM/CMPLATE
	EP-040	Environmental Water Dissolution, rev 1
	EP-940	Plutonium Purification, rev 0
	EP-960	Americium-Curium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.053 ± 0.032
YIELD 78 ± 33

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Test PU Matrix WATER
SDG 7162
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Plutonium 238		Plutonium 239/240	
Preparation batch 6893-025								
B0VYB9	N907086-01			7162-001	U		U	
BLK (QC ID=31322)	N907086-03			7162-003	U		U	
LCS (QC ID=31321)	N907086-02			7162-002	ok		ok	
Duplicate (N907086-01)	N907086-04			7162-004	-	U	-	U
Nominal values and limits from method				RDLs (pCi/L)	1.0		1.0	
200-B/C Cont. Area Reposting Smp&Any								

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6893-025	2σ prep error 5.0 %			Reference Lab Notebook 6893 pg.025												
B0VYB9	N907086-01			0.057	0.500			58		933			13	07/23/99	07/26	SS-006
BLK (QC ID=31322)	N907086-03			0.040	0.500			85		933				07/23/99	07/26	SS-008
LCS (QC ID=31321)	N907086-02			0.046	0.500			65		840				07/23/99	07/23	SS-055
Duplicate (N907086-01) (QC ID=31323)	N907086-04			0.038	0.500			95		706			14	07/23/99	07/27	SS-031
Nominal values and limits from method				1.0	0.500			20-105		700	100		180			

PROCEDURES	REFERENCE	PUPLATE
	EP-040	Environmental Water Dissolution, rev 1
	EP-940	Plutonium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.045 ± 0.017
YIELD 76 ± 34

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

METHOD SUMMARY

TOTAL STRONTIUM IN WATER

BETA COUNTING

Test SR Matrix WATER
SDG 7162
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Total Strontium
Preparation batch 6893-025					
B0VYB9	N907086-01			7162-001	U
BLK (QC ID=31322)	N907086-03			7162-003	U
LCS (QC ID=31321)	N907086-02			7162-002	ok
Duplicate (N907086-01)	N907086-04			7162-004	- U
Nominal values and limits from method				RDLs (pCi/L)	2.0
200-B/C Cont. Area Reposting Smp&Any					

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6893-025 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.025																
B0VYB9	N907086-01			0.37	0.500			88		400			10	07/22/99	07/23	GRB-208
BLK (QC ID=31322)	N907086-03			0.32	0.500			81		400				07/22/99	07/23	GRB-232
LCS (QC ID=31321)	N907086-02			0.31	0.500			87		400				07/22/99	07/23	GRB-231
Duplicate (N907086-01) (QC ID=31323)	N907086-04			0.42	0.500			78		200			11	07/22/99	07/24	GRB-203
Nominal values and limits from method				2.0	0.500					100			180			

PROCEDURES	REFERENCE	
	SR8990	
	EP-040	Environmental Water Dissolution, rev 1
	EP-500	Strontium-89,90 - Purification, rev 0
	EP-519	Strontium-89,90 Planchet Demounting and Yttrium Purification, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.36 ± 0.10
YIELD 84 ± 10

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0465

METHOD SUMMARY

GAMMA EMITTERS

GAMMA SCAN

Test GAM Matrix WATER
SDG 7162
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Cobalt 60		Cesium 137	
Preparation batch 6893-025								
B0VYB9	N907086-01			7162-001	U		U	
BLK (QC ID=31322)	N907086-03			7162-003	U		U	
LCS (QC ID=31321)	N907086-02			7162-002	ok		ok	
Duplicate (N907086-01)	N907086-04			7162-004	-	U	-	U
Nominal values and limits from method				RDLs (pCi/L)	25		15	
200-B/C Cont. Area Reposting Smp&Any								

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6893-025	2σ prep error 15.0 %	Reference Lab Notebook 6893 pg.025														
B0VYB9	N907086-01			6.3	0.500					400			10	07/20/99	07/23	01,04,00
BLK (QC ID=31322)	N907086-03			11	0.500					628				07/20/99	07/23	01,03,00
LCS (QC ID=31321)	N907086-02			19	0.500					629				07/20/99	07/23	01,01,00
Duplicate (N907086-01) (QC ID=31323)	N907086-04			5.2	0.500					628			10	07/20/99	07/23	01,04,00
Nominal values and limits from method				15	0.500					400			180			

PROCEDURES REFERENCE GAMMAHI
EP-100 Ge(Li) Preparation for Environmental Samples, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 10 ± 13
YIELD ____ ± ____

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

* LAB SAMPLE ID is the lab's primary identification for a sample.

* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.

* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.

* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

  QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

* The preparation batches are shown in the same order as the Method Summary Reports are printed.

* Only analyses of planchets relevant to the SDG are included.

* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.

* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

  These qualifiers should be reviewed as follows:

  X Some data has been manually entered or modified. Transcription errors are possible.

  P One or more results are 'preliminary'. The data is not ready for final reporting.

  2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

  Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.

* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.

* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.

* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.

* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.

* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

  The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

* ERRORs can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.

* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.

* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.

B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.

H Similar to 'L' except the recovery was high.

P The RESULT is 'preliminary'.

X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.

2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

DATA SHEET

* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.

* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.

* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.

* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

  An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The error of RESULT, including that introduced by rounding the result prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits for the recovery.

* The recovery is underlined if it is outside either of these ranges.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

  If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

  For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTs prior to printing.

  If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

  This value reported for this limit is at most 999.

* The second limit for the RPD is the larger of:

  1. A fixed percentage specified in the protocol.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

* The RPD is underlined if it is greater than either limit.

* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

  Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

  An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The errors of the two RESULTs, including those introduced by rounding them prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

  There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

  The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

  The J and X flags are as on the data sheet.

* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.

* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.

* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

  MDAs are underlined if greater than the printed RDL.

* Aliquots are underlined if less than the nominal value specified for the method.

* Prepareation factors are underlined if greater than the nominal value specified for the method.

* Dilution factors are underlined if greater than the nominal value specified for the method.

* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.

* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.

* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

SDG 7162
Contact L.A. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

METHOD SUMMARY

* Count times are underlined if less than the nominal value specified for the method.

* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.

* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.

* Days Held are underlined if greater than the holding time specified in the protocol.

* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1÷3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

SDG 7162
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0465

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/28/99

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-080-01	Page 1 of 1

Collector R. Nielson/B. Porter	Company Contact Duane Jacques	Telephone No. 373-5299	Project Coordinator TRENT, SJ	Price Code 7N	Data Turnaround 45 Days
Project Designation 200-B/C Controlled Area Reposting Sampling and Analysis	Sampling Location 200 East		SAF No. B99-080		
Ice Chest No. #567	Field Logbook No. EL-1381-2		Method of Shipment Federal Express		
Shipped To TMA/RECRA	Offsite Property No. A990184		Bill of Lading/Air Bill No. 42357952 7536		
			COA		

POSSIBLE SAMPLE HAZARDS/REMARKS Special Handling and/or Storage	Preservation	HNO3 to pH <2	HNO3 to pH <2	HNO3 to pH <2							
	Type of Container	P	P	P							
	No. of Container(s) Volume	1 1000mL	1 1000mL	2 1000mL							
SAMPLE ANALYSIS		Americium-241; Isotopic Plutonium	See item (1) in Special Instructions.	Strontium-89,90 -- Total Sr							

Sample No.	Matrix *	Sample Date	Sample Time								
B0VYB9	Water	7-13-99	0605	X	X	X					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By Renee Nielson/R. Nielson	Date/Time 0605 7-13-99	Received By Ref # 1A	Date/Time 7-13-99 0605
Relinquished By Ref # 1A	Date/Time 7-15-99 1140	Received By Renee Nielson/R. Nielson	Date/Time 1140 7-15-99
Relinquished By Renee Nielson/R Nielson	Date/Time 1330 7-15-99	Received By Fed Ex	Date/Time 7-15-99
Relinquished By Fed Ex	Date/Time 7-16-99 9:00	Received By JR Corso	Date/Time 9:00 7-16-99

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy(Water) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

RJN 7/15/99

~~Samples in~~ Samples did not come from a Radiologically Controled area.

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Thermo NUtech - Richmond

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT

Client: Bechtel Hanford Date/Time received 7-16-99 9:01

CoC No. B99-080-01

Container I.D. No. 567 Requested TAT (Days) 45 P.O. Received Yes [ ] No [✓]

INSPECTION

1. Custody seals on shipping container intact? Yes [✓] No [ ] N/A [ ]
2. Custody seals on shipping container dated & signed? Yes [✓] No [ ] N/A [ ]
3. Custody seals on sample containers intact? Yes [✓] No [ ] N/A [ ]
4. Custody seals on sample containers dated & signed? Yes [✓] No [ ] N/A [ ]
5. Cooler Temperature: _____ Packing material is: Wet [ ] Dry [✓]
6. Number of samples in shipping container: 3
7. Number of containers per sample: _____ (Or see CoC ✓)
8. Paperwork agrees with samples? Yes [✓] No [ ]
9. Samples have: Tape [ ] Hazard labels [ ] Rad labels [ ] Appropriate sample labels [✓]
10. Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]
11. Describe any anomalies: _____

13. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date _____
14. Received by JR Arroso Date: 7-16-99 Time: 9:00

LOGIN

TNU W.O. No. _____ Group No. _____ Client W.O. No. _____

PROGRAM MANAGER

Sample holding times exceeded? Yes [ ] No [ ]

Client Notified: Name _____ Date/time _____